



SAFETY AND MAINTENANCE MANUAL

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INSTRUCTION MANUAL FOR SAFETY AND MAINTENANCE

1 INTRODUCTION

THIS MANUAL IS FOR SAFETY AND MAINTENANCE INSTRUCTIONS. FOR TECHNICAL INFORMATION AND ADDITIONAL GUIDELINES OF THE MACHINE PLEASE GO THROUGH OUR TECHNICAL MANUAL.

The Stud-Juncture you have purchased is an appliance of advanced technical features and superior quality. It has been constructed and designed according to latest technical principles and complies with all technical regulations. For safe and trouble-free operation at all times we recommend that you please observe carefully all safety procedures/instructions.

2 SYMBOL USAGE



Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.



This group of symbols means Warning! Watch Out!
Possible ELECTRIC SHOCK, MOVING PARTS, and other hazards.
Consult symbols and related instructions below for necessary actions to avoid the hazards.

3 GENERAL INSTRUCTIONS

- 1. BEFORE INSTALLING AND USING THE STUD-JUNCTURE, CAREFULLY READ AND UNDERSTAND THE INSTRUCTIONS GIVEN IN THIS MANUAL. THIS MANUAL MUST BE KEPT IN A PLACE FAMILIAR TO ALL USERS FOR THE ENTIRE OPERATIVE LIFE-SPAN OF THE MACHINE. THE EQUIPMENT MUST BE USED SOLELY FOR WELDING OPERATIONS.**
2. The safety instructions must be followed at all times.
3. Ensure that the respective operator has read and understood the operating instructions prior to installation.
4. Only well trained and qualified personnel may operate the Stud-Juncture.
5. Prevent the machine being operated by children or unauthorized personnel.
6. Have a trained electrician inspect the mains connection for correct fusing and earthing. If any malfunctions occur which you cannot remedy yourself, call our after-sales service.
7. Have a fire extinguisher nearby and know how to use it.
8. Call for proper medical help in case of accidents.

4 CAUTION

- The equipment must be used in suitably ventilated or industrial area.

- **ARC RAYS**



Arc rays (visible and invisible uv light) can burn your eyes and skin.
Arc rays emit UV light and have been found to cause skin cancer.
Prolonged exposure to arc rays can cause blindness.

- **NOISE CAN DAMAGE HEARING**



Noise created while the welding process can damage hearing.

- **WELDING FUMES AND GASES**



Welding fumes, gases and extreme heat are hazardous to health.

- Operators and personnel working in close proximity must wear suitable eye, ear and body protection.
- Hot metal spatter can cause fire and burns.



DO NOT touch hot parts bare handed.

- High levels of current can cause electrocution.

- **MOVING PARTS CAN CAUSE INJURY**



Keep away from moving parts such as fans. Keep all doors, panels, covers, and guards closed and securely in place. Remove doors, panels, covers, or guards for maintenance as necessary. Reinstall doors, panels, covers, or guards when maintenance is finished and before reconnecting input power.

- Nausea, dizziness, irritation of the nose, throat and eyes are some of the short term effects.
- Iron deposits in the lungs, central nervous system effects, Bronchitis and Cancer are some long term effects.

5 SAFETY

5.1 Personal Safety:

For his/her own safety, the operator must wear protective clothing during welding, which includes the following:

- Wear a non-flammable, dry, leather apron to protect your clothes from welding spatters that are generated during the welding process.
- Wear Leather gloves.
- Safety goggles with an adequate degree of protection to protect your eyes from welding spatters and flashes of light that are generated during the welding process.
- Wear a head protection/helmet.
- Wear ear protection to prevent loud noise.
- Wear Dry, insulating shoes.
- DO NOT wear or carry any metallic jewelry, rings, chains, watches, etc.
- During the welding process, persons wearing heart pace-makers must be kept at a safe distance from the equipment and the welding cables, because the strong magnetic fields could endanger their lives.



- In addition to the above, all normal accident prevention regulations must be observed.

5.2 Safety before operating the equipment:

- Only qualified persons should install, operate, maintain, and repair this equipment.
- Ensure that this welding machine is installed and grounded properly according to the Owner's Manual.
- Make sure you have checked the welding area and its near-by areas properly.
- Before operating double-check all the connections.

5.3 Safety while operating the equipment:

- During operation, keep everybody, especially children, away.
- Do not work alone during the operation. Always have a trained watch person nearby.
- **ELECTRIC SHOCK CAN KILL.**



Do not touch live electrical parts. Touching live electrical parts can cause fatal shocks or severe burns.

- Do not touch hot parts, they can cause severe burns.
- Insulate yourself from work and ground using dry insulating mats or covers, big enough to prevent any physical contact with work or ground.
- **BARE WIRING CAN KILL.**

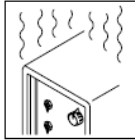


Frequently inspect input power cord for damage or bare wiring. Replace cord immediately if damaged.

- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.

- Do not drape cables over your body.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain the equipment according to manual.
- Do not breathe the welding fumes and gases
- Do not weld in locations near degreasing, cleaning, or spraying operations.
- The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated and while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.
- Reduce current or reduce duty cycle before starting to weld again.

▪ **OVERUSE CAN CAUSE OVERHEATING**



Allow cooling period; follow rated duty cycle.

▪ **WELDING CAN CAUSE FIRE OR EXPLOSION**



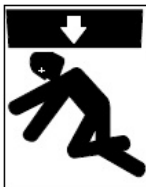
Check and be sure the area is safe before doing any welding. Welding on closed containers such as tanks, drums, or pipes can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot work-piece and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating or fire.

▪ **BUILD UP OF GAS CAN KILL**



Shut off shielding gas supply when not in use. Always ventilate confined spaces or use approved air-supplied respirator.

▪ **FALLING UNIT CAN CAUSE INJURY.**



Use lifting eye to lift unit only, NOT running gear, gas cylinders or any other accessories. Use equipment of adequate capacity to lift and support unit. If using lift forks to move unit, be sure forks are long enough.

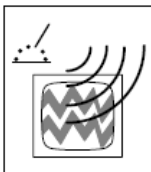
▪ **FLYING METALS CAN CAUSE INJURY.**



Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag. Wear approved safety glasses with side shields even under your welding helmet.

▪ **ARC WELDING CAN CAUSE INTERFERENCE**

During welding operations, intense magnetic and electrical fields are unavoidably produced and these may interfere with other sensitive electronic equipment.



5.4 Safety of the equipment:

- Do not install or place the equipment on, over or near combustible surfaces, flammables.
- Only a suitable mains plug or a fixed mains connection may be used for the mains connection.
The installation of a fixed mains connection (including fitting of the mains plug) may only be carried out by a trained electrician.
- Prevent any kind of moisture, water or foreign substances from entering the power source.
Do not block or filter airflow to unit.
- All cables must be in perfect condition. Cables with defective insulation must be replaced immediately.
- Keep the cables straight; do not keep in circular form which creates magnetic field.
- All parts of the housing must be firmly attached. Operation with an open housing is not permissible, because then there is no protection against touching live parts and effective ventilation is also prevented.
- The equipment and especially the interior parts must be kept clean from time to time. This should be strictly followed especially when working in dusty surroundings. Cleaning should be done because in case of metallic dust it may lead to short-circuit and can cause damage.
- Sufficient cooling should be provided as the cooling air is taken in at the bottom and blown out at the rear side. Provide sufficient facilities of air ventilation. Do not cover the ventilation openings.
- The welding gun must be in perfect condition. Never dip stud gun in water for cooling.
- Avoid unintentional triggering of the gun pushbutton.
- The Equipment should also be inspected by a qualified specialist at regular intervals especially following any malfunction.

6 MAINTENANCE

6.1 Maintenance of Welding Gun

The welding gun must be kept perfectly insulated. Protect the gun against any kind of moisture. The gun should never be used in wet condition; it must be well dried before using.

In case of any damage to its body or cables, welding must be discontinued at once. Chucks, ceramic ferrule grips, legs etc. should be checked regularly and replaced immediately if damaged. Do not tighten the screws beyond limit. Even if tightened, the jaws no longer have sufficient grip, the chuck must be replaced. The gun since it carries out most of the welding functions should be periodically (at least every 3-4 months) cleaned.

6.2 Maintenance of Welding Machine

Use only well-maintained equipment. Repair or replace damaged parts at once.

Protect the equipment against any kind of moisture.

Reduce current or reduce duty cycle before starting to weld again.

Overuse can cause overheating therefore allow cooling period; follow rated duty cycle.

Turn off all the equipment when not in use.

6.3 Maintenance of Welding and Control cables

All cables must be inspected regularly to ensure that no danger exists from worn or damaged insulation or from unsound electrical connections. Special note should be made of the cables close to the gun where maximum wear occurs. As well as producing inconsistent welds, worn cables can overheat or spark giving rise to the risk of fire. Protect cables, especially connection points against moisture. Do not clean cables with water jets or solvents.

7 Disposal

The equipment either wholly or any of its component parts may be disposed of as part of general industrial waste or passed to a scrap merchant. None of the components used in the manufacture are toxic, carcinogenic or harmful to health in their “as supplied” condition.

8 Advantages of Stud Welding

Stud welding provides fixing and fastening solutions in many metal and other heavy engineering industries and small scale applications.

The process involves the following advantages:-

- The welded joint is stronger than the parent material or the stud.
- Deep weld penetration.
- High speed welding of studs on thin steel sheets is possible.
- Limits down time.
- Cuts labor and material cost.
- Is user friendly and easy to operate.
- Machine is equipped with effective safety operations for user.
- Self diagnostic thereby avoiding delays in trouble shooting.
- Fast attachment.
- No reverse marking.
- Stud welding is ideal for applications where access cannot be made to the reverse side of an assembly such as mounting circuit boards, rails, instruments, earth points and many different components.
- No holes hence no leaking or weakening of the sheet.
for example: inspection hatches and cover plates
- Tamper proof.
- High operating factors in mechanized applications.
- High deposition rates (over 100 lb/h (45 kg/h) have been reported).
- Sound welds are readily made (with good process design and control).
- Weldable even onto very thin plates, i.e. 1/8 of stud diameter.
- Minimal welding fume or arc light is emitted.
- Practically no edge preparation is necessary.
- The process is suitable for both indoor and outdoor works.
- Very low distortion by extremely short welding time.
- Welds produced are sound, uniform, ductile, corrosion resistant and have good impact value.
- Single pass welds can be made in thick plates with normal equipment.
- 50% to 90% of the flux is recoverable.
- The process involves less maintenance cost.
- The arc is always covered under a blanket of flux, thus there is no chance of spatter of weld.
- Skill of the operator does not influence the quality of spot welds obtained by this process.
- The process is normally free from smoke and spatter.
- Stud welding is suitable for fixing fluid, air lines, wiring looms, machine guards, handles, insulations and fireproofing materials.

Substitute for Inserts

Stud welding replaced inserts resulting in faster productions and stronger joints. Thinner sheets could be used and with no reverse marking.

Substitute for Drilling and Tapping

Stud welding provides manufacturer to speed up production considerably. An alternative solution of using thicker flanges would have resulted in additional time and cost implications.

Substitute for Back Welding

Production increased tenfold when stud welding replaced a back welding process. With stud welding there is no need to grind the top surface flat and polish off excess material and burn marks which saved time a lot.

Substitute for Bolts

Component became tamper-proof, clean design was the biggest benefit on another. On the gauge was reduced and leakage was prevented. Finally stud welding solved the problem of loose bolts and inaccessibility to the bolt head after assembly.

Substitute for Resistance Welding

Removed a bottleneck by not having to take the biggest component to a large resistance welding machine. Replacing soldering cured a corrosion problem caused by a solder flux. Some components which were previously brazed sustained damage because of the long heat cycle.

9 Applications

Stud welding has replaced many technologies and has proved the best in terms of time and even cost. Stud welding can be used in place where Nut-Bolt has been used and places where one sided welding is must.

Material applications where stud welding can be used

- Carbon steels (structural and vessel construction)
- Low alloy steels
- Stainless steels
- Nickel-based alloys
- Surfacing applications (wear-facing, build-up, and corrosion resistant overlay of steels)

Stud welding has applications from the repair shop to on-site situations. It has been successfully used in:

- **Construction**

Drawn Arc welding is still used for many applications in the construction industry. Arc welding is often used on bridges. Arc welding can also be used on buildings, pre-Studded Beams, Thru-deck, Straight to Beams, Sheet Piles, Pre-Cast Concrete Beams, Mobile Welding Rigs, Static Welding. Arc welding is a simple welding method that can be used by almost any welder, and it can be used on almost any type of metal. Amongst the various methods of welding this method suits the best to the construction industry for stud welding.

- **Shipbuilding**

Ship building is the oldest uses of stud welding. Stud welding revolutionized ship building. Ship's hulls, which may be held together by rivets or other methods of construction, often benefit from arc welding the seams of the steel plates together. The ships are welded both from the outside of the ship as well as

the inside of the ship, creating a double seam that helps make the ship even more water tight. Naval ships undergo this process, and many civilian ships still do it as well.

- **Boilers**

Steel studded tubes are used instead of finned tubes for heat transfer in the petrochemical industry, generally in furnaces and boilers where the surface is exposed to a very corrosive environment and where very dirty gas streams require frequent or aggressive cleaning. If required, the external surfaces of studded tubes can be treated with a protective coating.

- **Automobile**

Stud welding finds its huge application in automobile industries. Stud welding is used in body parts for stabilization of hollow parts and welding of watertight stainless steel rivet. Stud welding is used in interior for soft welding of dashboard and used in doors for window winder and speaker assembly.

- **Power plant**

Stud welding, an often-overlooked process, can have a significant effect on the life-cycle cost of a product. Stud welding can be performed with a hand tool that is brought to the material. In coal-fired power plants, so much relies on the little things. The studs transfer heat from the hot side (the furnace) into the boiler tube. A refractory coating, which protects the tubes from erosion, is applied over the studs. As the stud wears, so does the refractory coating. At some point the studs become so short that the furnace has to be shut down, the studs re welded, and the refractory coating reapplied. It is also used to endure heat, oxidation and corrosion.

- **Tubes**

PVC tubes are used to increase the surface area to achieve higher heat transfer rate. They are used in fluidized bed coils and fluidized bed super-heaters. They are also used in refineries as re-heaters.

Stud welding is used in many small scale applications like:-

- Kitchen appliances
- AC fan motors
- Furnaces
- Geysers
- Windmills
- Hydraulic
- Lift panels
- Water tanks
- Power transformers
- Oil & gas industries
- Refractory
- Wear plates
- Wear studs
- Washers & Dryers
- Vacuum Cleaners
- Medical equipments
- Electrical fuel
- Security body trims
- Fabrication of pulleys and sheet metal products
- Automated welding & assembly systems
- Military defense and marine vehicles

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